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IS 15811 (2008): Long-range water-cum-foam monitor with self-inducting, aspirating and non-aspirating jet and spray/fog nozzle for fire fighting -Specification [CED 22: Fire Fighting]



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“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक

अग्नि शमन हेतु स्वतः प्रेरक, अन-अवशोषी जेट और
स्प्रे/फाग नौजल प्रकार के लम्बी रेंज वाले जल एवं
झाग मॉनीटर — विशिष्टि

Indian Standard

LONG-RANGE WATER-CUM-FOAM MONITOR
WITH SELF-INDUCTING, ASPIRATING AND
NON-ASPIRATING JET AND SPRAY/FOG NOZZLE FOR
FIRE FIGHTING — SPECIFICATION

ICS 13.220.10

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Fire Fighting Sectional Committee had been approved by the Civil Engineering Division Council.

Water—*cum*—foam monitors with aspirating or non-aspirating type (jet and spray/fog) nozzle are used for the protection of Class B flammable liquid risk. With the help of this equipment, it is possible to direct the flow of foam (and in some cases water) at any angle in horizontal and vertical axis. This standard has been formulated to lay down minimum performance requirements.

When this equipment is used with sea water, aluminium and carbon steel parts shall not be used.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of specified value in this standard.

Indian Standard

LONG-RANGE WATER-CUM-FOAM MONITOR WITH SELF-INDUCTING, ASPIRATING AND NON-ASPIRATING JET AND SPRAY/FOG NOZZLE FOR FIRE FIGHTING — SPECIFICATION

1 SCOPE

This standard lays down the requirements for stand post type or trolley/trailer mounted water/foam monitor of nozzle size: 63 mm, 75 mm, 100 mm and 150 mm used for fire fighting at various flow rates.

2 REFERENCES

The standards listed at Annex A contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated at Annex A.

3 GENERAL

3.1 The size of the water/foam monitor is denoted by its nominal size of waterway and designated for rated discharge capacity through its nozzle. The water foam monitor shall be designed for minimum of 1.2 N/mm² rated pressure.

3.2 The shape of water foam monitor shall be so designed that it shall allow free flow of water with minimum friction loss and maximum stability against nozzle reaction. The manufacturer can adopt any shape to meet the design and performance data.

3.3 The water foam monitor shall consist of following main components:

- a) Base flange with reducer or body,
- b) Elbow or bend of 180°, 90°, 45° or of suitable angle,
- c) Swivel joint for horizontal and vertical rotation,
- d) Waterway barrel or pipe,
- e) Manual lock with handle or worm and worm wheel with hand wheel,
- f) Water foam nozzle, aspirating or non-aspirating type with pick up tube and with or without jet ratio controller, and
- g) Drain valve.

4 MATERIAL

4.1 The material of construction of various parts of the water foam monitor with nozzle shall be defined on the basis of material of construction of waterway required for water foam monitor as given in Table 1.

NOTE — The material of construction to be selected as agreed between the purchaser and the manufacturers keeping in view the compatibility of materials.

4.2 The dimension of inlet flange shall be as agreed between the manufacturer and the purchaser.

5 CONSTRUCTION

5.1 The carbon steel and stainless steel waterway of water foam monitor shall be of welded, screwed or flanged joints. The copper alloy or stainless steel of as cast waterway shall be screwed or flanged joint. All screwed joints except nozzle shall have minimum of 20 mm threading length and epoxy based sealant may be used for sealing purpose and threads shall be locked permanently with grub screw so that threads will not get unscrewed during horizontal or vertical rotation of monitor.

5.2 The inlet flange nominal size shall be same as that of waterway size of water foam monitor or higher size for better hydraulic efficiency. The water foam monitor shall have swivel joint to provide horizontal rotation of 360° continuous in clockwise or anti-clockwise direction. The vertical rotation shall be minimum 135° (90° upward and 45° downward). This traversing mechanism shall be either single handle bar type with manual positive locks for unattended operation or the worm and worm wheel type with irreversible self-locking for unattended operation.

5.3 The water foam monitor of 100 NB to 150 NB shall be worm and worm wheel type for vertical and

Table 1 Material of Construction

(Clause 4.1)

Sl No. (1)	Components (2)	Carbon Steel Waterway (3)	Stainless Steel Waterway (4)	Copper Alloy Waterway (5)
i)	Inlet flange	IS 2002 Gr. I IS 2004	IS 6911	IS 318 Gr. LTB-II IS 28 Gr. II
ii)	Reducer	IS 1239 (Part 2) IS 11428	Stainless Steel	IS 318 Gr. LTB-II IS 28 Gr. II
iii)	Elbow/Bend	IS 4310	Stainless Steel	IS 318 Gr. LTB-II IS 28 Gr. II
iv)	Swivel joint and worm wheel	IS 318 LTB-II IS 28 Gr. II	IS 318 LTB-II IS 28 Gr. II Stainless Steel	IS 318 Gr. LTB-II IS 28 Gr. II
v)	Worm shaft	Stainless Steel	Stainless Steel	Stainless Steel
vi)	Manual lock	IS 291	Stainless Steel	IS 291
vii)	Waterway/Barrel/Pipe	Seamless Tube IS 1239 (Part 2) IS 11428	Seamless SS Cast Stainless Steel	IS 318 LTB-II IS 28 Gr. II
viii)	Handle hand wheel	IS 1732 IS 210	IS 1732 IS 210	IS 1732 IS 210
ix)	Nozzle	IS 617 Gr 4450/4225 IS 318 LTB-II IS 28 Gr. II	IS 3444	IS 318 LTB-II IS 28 Gr. II
x)	Jet ratio controller	IS 318 LTB-II IS 28 Gr. II	Stainless Steel	IS 318 LTB-II IS 28 Gr. II
xi)	Drain valve	IS 2004	Stainless Steel	IS 778

horizontal traversing mechanism. The water foam monitor of 63 and 80 NB shall be manual lock or worm and worm wheel type for vertical and horizontal traversing mechanism.

5.4 The water foam monitor outlet shall have either external thread confirming to IS 2643 with Class A tolerance or flange joint. A pressure gauge at suitable position may be provided on the water foam monitor body or barrel. The water foam monitor may be provided with suitable water vanes in the bends or barrels to reduce turbulence and friction loss to increase performance of nozzle.

5.5 The aspirating type (foam) nozzle (foam barrels) and non-aspirating type nozzle shall be with jet and spray/fog arrangement. Aspirated foam nozzles shall consist mainly two parts that is body and barrel (pipe). The body shall house the water nozzle and diffuses and the foam inlet. The barrel shall be of suitable size that is, diameter and length to give desired performance.

5.6 The non-aspirating nozzle shall be jet and spray type and shall have provision for quick change over from jet to full spray/fog and *vice-versa* under flow condition. The inlet of nozzle shall have internal threads to IS 2643 with Class A tolerance or it shall be flanged joint of same size as that of water foam monitor outlet size. The nozzle shall be capable of inducing foam concentrate. The concentrate

inducting port shall have threaded joint confirming to IS 2643 to facilitate the pick up tube connection or it can be quick release cam lock type. The nozzle shall be provided with pick up tube of minimum 2.5 m length of clear PVC suction hose with dip tube made out of brass, copper alloy or stainless steel and other end threaded or cam lock type to suit the nozzle. In place of pick up tube suitable ports shall be provided when jet ratio controller is used with the nozzle for induction of foam concentrate.

5.7 The nozzle may be provided with fix or spinning teeth ring for better fog application. This spinning teeth ring can be of same material as that of nozzle or can be non-metallic material. The jet ratio controller may be provided, if necessary for proper induction of foam concentrate.

6 WORKMANSHIP AND FINISH

The complete assembly shall be of good workmanship and finish and free from burns and sharp edges. Particularly waterway shall have smooth finish to reduce friction loss.

7 ANTI-CORROSIVE TREATMENT

All steel components subject to direct water contact shall be hot dip galvanized after fabrication to a minimum thickness of 0.03 mm. The aluminium parts subject to direct water contact shall be hard anodized to a minimum thickness of 0.015 mm. The thickness

of galvanizing shall be measured with suitable thickness measuring meter.

8 LEAKAGE TESTING

8.1 The entire assembly shall be subjected to hydraulic pressure of 2.3 N/mm² for a period of 5 min and there shall not be any leakage. During this test horizontal rotation shall be carried out 5 times in clockwise and in anti-clockwise direction, then vertical up and down for 5 cycles.

During this test there shall be no leakage observed in any of the swivelled joints. After the above test is carried out the performance test as given in 8.1 shall be performed.

8.2 The jet ratio controller, if provided, then it shall be hydraulic tested at 2.3 N/mm² for a period of 5 min and no leakage shall be observed.

9 PERFORMANCE REQUIREMENT

The water foam monitor shall be tested at monitor inlet base/mating/flange of 0.7 N/mm² for flow, induction rate and horizontal reach as given in Table 2.

For purpose of induction test, water should be used.

For expansion and foam jet reach test a foam concentrate shall be used.

The data given in Table 2 are for effective reach for water and foam in still air condition. The effective reach shall be worked out as overall reach less 5 percent. Spray/Fog angle shall be 120° minimum.

Flow through monitor is total flow plus induction rate. The total flow shall be within $\begin{matrix} +5 \\ -0 \end{matrix}$ percent. The induction rate shall be 3 percent to 4 percent for 3 percent induction requirement and 6 percent to 7 percent for 6 percent induction requirement. The expansion ratio shall be 1:4 times minimum for non-aspirating and 1:6 times minimum for aspirating type and shall be measured as per IS 4989.

10 ACCESSORIES

The accessories shall include nozzle spanner.

11 PAINT

The water foam monitor shall be painted with fire red colour confirming to shade No. 536 or 538 of IS 5. The paint shall conform to IS 2932.

Table 2 Minimum Performance Requirement
(Clause 9)

Sl No.	Horizontal Water and Foam Reach			
	Monitor Size mm	Water Discharge Capacity in LPM at 0.7 N/mm ² Nozzle Pressure	Non-aspirating	
			Effective water reach at 30° nozzle elevation, Min m	Effective foam reach at 30° nozzle elevation, Min m
(1)	(2)	(3)	(4)	(5)
i)	63	1 750	53	45
ii)	75	2 580	60	52
iii)	75	3 000	62	54
iv)	100	3 500	64	56
v)	100	3 800	66	58
vi)	100	4 150	68	60
vii)	150	4 750	69	61
viii)	150	5 680	72	64
ix)	150	7 500	74	64
x)	150	8 000	76	66
xi)	150	10 000	82	74
xii)	150	12 500	90	80

NOTE — For aspirating type, reach shall be 10 percent less.

12 MARKING

12.1 Each water foam monitor shall be clearly and permanently marked with the following minimum requirements:

a) *On monitor:*

- 1) Manufacturer's name and trade-mark;
- 2) Nominal size, in mm;
- 3) Serial number;
- 4) Year of manufacturing; and
- 5) Maximum working pressure, in N/mm².

b) *On nozzle:*

- 1) Manufacturer's name and trade-mark, and

- 2) Flow at specified pressure and foam concentrate induction rate.

12.2 BIS Certification Marking

The monitor may also be marked with the Standard Mark.

12.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

ANNEX A

(Clause 2)

LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
5 : 2004	Colours for ready mixed paints and enamels (<i>fifth revision</i>)	2002 : 1992	Steel plates for pressure vessels for intermediate and high temperature service including boilers (<i>second revision</i>)
28 : 1985	Phosphor bronze ingots and castings (<i>fourth revision</i>)		
210 : 1993	Gray iron castings — Specification (<i>fourth revision</i>)	2004 : 1991	Carbon steel forgings for general engineering purposes (<i>third revision</i>)
291 : 1989	Naval brass rods and sections for machining purposes — Specification (<i>third revision</i>)	2643 : 2005	Pipe threads where pressure-tight joints are not made on the threads — Dimensions, tolerances and designation (<i>third revision</i>)
318 : 1981	Specification for leaded tin bronze, ingots and castings (<i>second revision</i>)	2932 : 2003	Enamel, synthetic, exterior; a) undercoating b) finishing — Specification (<i>third revision</i>)
617 : 1994	Aluminium and aluminium alloy ingots and castings for general engineering purposes (<i>third revision</i>)	3444 : 1999	Corrosion resistant high alloy steel and nickel base castings for general applications — Specification (<i>third revision</i>)
778 : 1984	Specification for copper alloy gate, globe and check valves for water works purposes (<i>fourth revision</i>)	4310 : 1967	Welded steel pipe fittings for marine purposes
1239 : 1990	Steel tubes, tubular and other wrought steel fittings — Specification:	4989 : 2006	Foam concentrate for producing mechanical foam for fire fighting — Specification
(Part 1) : 2004	Steel tubes (<i>sixth revision</i>)	6911 : 1992	Stainless steel plate, sheet and strip (<i>first revision</i>)
(Part 2) : 1992	Mild steel tubulars and other wrought steel pipe fitting (<i>fourth revision</i>)	11428 (Parts 1 to 3) : 1985	Specification for wrought carbon steel butt-welding pipe fittings
1732 : 1989	Dimension for round and square steel bars for structural and general engineering purposes (<i>second revision</i>)		

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

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